Michael T. Davis Pre-Calculus	Units 1.5 & 1.6 QUIZ October 3, 2016

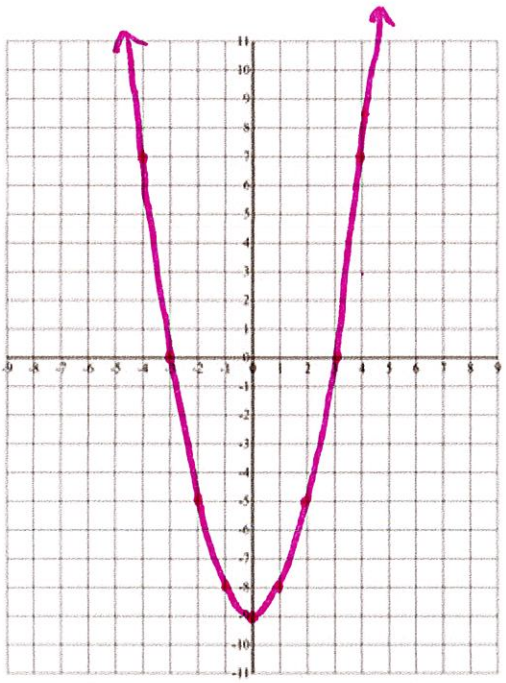
Name: Solutions

1. Neatly graph the parabola with quadratic equation $f(x)=x^2-9$

$f(x) = x^2+0x-9$

Vertex $V(0,-9)$

$a=1$ pattern is 1, 3, 5, 7, etc.



2. Neatly Graph the parabola with quadratic equation

$g(x)=(x-1)(x-5)$

zeros $\{1, 5\}$

$x-1=0$ $x-5=0$

$x=1$ $x=5$

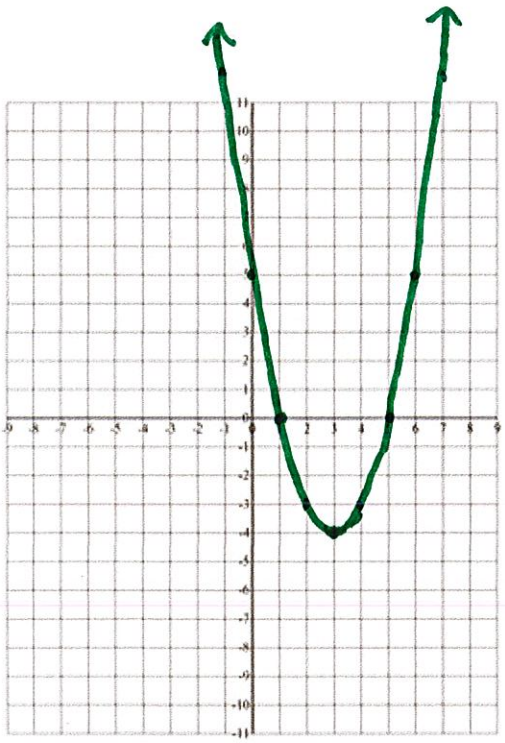
x-intercepts $(1,0)$ & $(5,0)$

axis $x=3$

$g(3) = (3-1)(3-5) = (2)(-2) = -4$

Vertex $V(3,-4)$

Pattern 1, 3, 5, 7, etc..



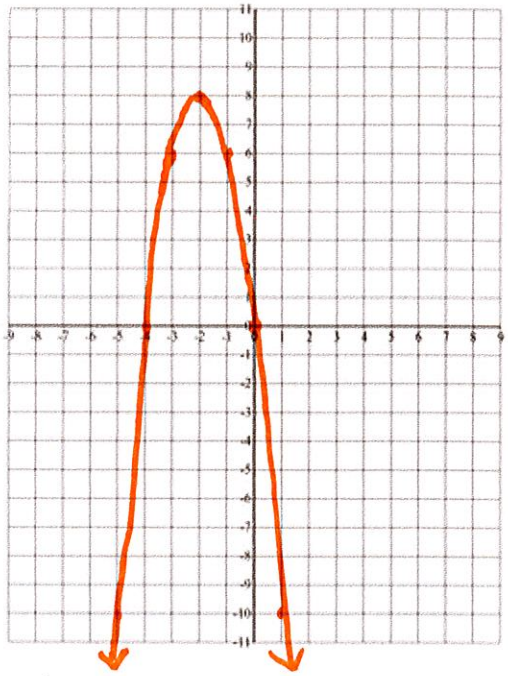
3. Graph the parabola with quadratic equation $p(x)=-2(x+2)^2+8$

V(-2, 8)

a = -2
opens down since a < 0

axis has equation x = -2

Pattern 2, 6, 10, etc.



4. Determine the real zeros (x-intercepts) of the parabola with equation $f(x)=x^2+4x-28$, i.e. solve $0=x^2+4x-28$

$0 = (x+7)(x-4)$

$x+7=0$ $\quad$ $x-4=0$

$x=-7$ $\quad$ $x=4$

$\{-7, 4\}$

5. Determine the real zeros (x-intercepts) of the parabola with equation $j(x)=3x^2-12x$, i.e. solve $0=3x^2-12x$

$0 = 3x^2-12x$ $\quad$ $0 = 3x(x-4)$

$3x=0$ $\quad$ $x-4=0$

$x=0$ $\quad$ $x=4$

$\{0, 4\}$

6. Determine the equation for the axis of symmetry of the parabola defined by the quadratic function $g(x)=2(x-5)(x+1)$

$x=5$ $\quad$ $x=-1$ are x-intercepts

the axis is in between the x-intercepts
the midpoint between x = -1 & x = 5 is x = 2

The equation is x = 2

7. Determine the real zeros (x-intercepts) of the parabola with equation $p(x)=x^2+4x-1$.

$a=1$, $b=4$, $c=-1$

x^2+4x-1 does not factor

therefore use the quadratic formula

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a} \qquad x=\frac{-4\pm\sqrt{4^2-4(1)(-1)}}{2(1)}$$

$$x=\frac{-4\pm\sqrt{16+4}}{2} \qquad x=\frac{-4\pm\sqrt{20}}{2} \qquad x=\frac{-4\pm\sqrt{4\cdot5}}{2}$$

$$x=\frac{-4\pm2\sqrt{5}}{2} \qquad x=-2\pm\sqrt{5} \qquad \{-2+\sqrt{5},-2-\sqrt{5}\}$$

8. Convert the quadratic equation $f(x)=x^2-8x+11$ to vertex form and write the coordinates of the vertex.

$f(x)=(x^2-8x+16)+11-16$

$\frac{1}{2}(-8)=-4$

$(-4)^2=16$

$f(x)=(x^2-8x+16)-5$

$f(x)=(x-4)(x-4)-5$

$f(x)=(x-4)^2-5$

the vertex coordinates are $V(4,-5)$

9. Convert the quadratic function $k(x)=\frac{1}{2}(x-6)^2-9$ to standard form

$$K(x)=\tfrac{1}{2}(x-6)(x-6)-9$$
$$=\tfrac{1}{2}(x^2-6x-6x+36)-9$$
$$=\tfrac{1}{2}(x^2-12x+36)-9$$
$$=\tfrac{1}{2}x^2-6x+18-9$$
$$=\tfrac{1}{2}x^2-6x+9$$

10. Convert the quadratic function $f(x)=2x^2+7x-15$ to factored form and state the zeros of the function.

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$(1)(-15)$

$(-1)(15)$

$(3)(-5)$

$(-3)(5)$

$f(x)=(x+5)(2x-3)$

$0=(x+5)(2x-3)$

$x+5=0$ $\qquad$ $2x-3=0$

$x=-5$ $\qquad$ $2x=3$

$x=\frac{3}{2}$

zeros $\{-5,\frac{3}{2}\}$

11. Write an equation of the quadratic function whose graph is shown below:

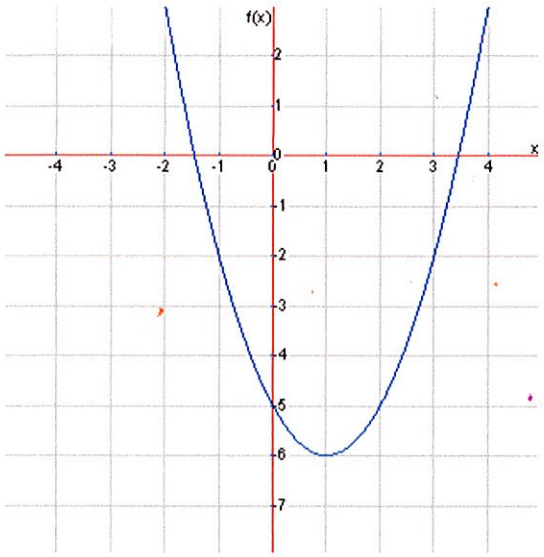
Vertex $V(1,-6)$

Pattern 1, 3, ...

$a = 1$

$f(x) = (x-1)^2 - 6$

in vertex form



Extra Credit

Determine the vertex form of the quadratic function with equation $h(x) = 3x^2 - 18x + 31$